Health Consultation

GIBRALTAR MANUFACTURING COMPANY

EAST ALTON, MADISON COUNTY, ILLINOIS

CERCLIS NO. IL0000034322

MARCH 27, 1998

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR TOLL FREE at
1-800-447-1544
or
Visit our Home Page at: http://atsdr1.atsdr.cdc.gov:8080/

HEALTH CONSULTATION

GIBRALTAR MANUFACTURING COMPANY

EAST ALTON, MADISON COUNTY, ILLINOIS

CERCLIS NO. IL0000034322

Prepared by:

Illinois Department of Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

The purpose of this health consultation is to evaluate information currently available for the Gibraltar Manufacturing site for any known or possible human health hazards. The Illinois Department of Public Health (IDPH) used site-specific information provided by the Illinois Environmental Protection Agency (IEPA), the U.S. Environmental Protection Agency (USEPA), and other agencies to develop this health consulation. IDPH staff conducted a file review at the IEPA Bureau of Land in 1997 [1]. IDPH made observations during a visit to the site and surrounding area on June 26, 1997. IDPH conducted interviews with IEPA staff in Springfield, Illinois, offices [2]. IDPH primarily used an assessment generated by Shifrin & Associates, an environmental engineering firm hired by the property owner's estate, for environmental data [3].

Gibraltar Manufacturing is a former foundry located within an industrialized area of East Alton, Illinois, north of the Mississippi River (Figure 1). Chessen Lane borders the west side of the site, and the Norfolk and Western Railroad borders the south side. Plant buildings have been demolished and removed. Both empty and filled drums found on the site were evaluated and removed in 1992. The use of electrical capacitors at the site may have contributed to the presence of polychlorinated biphenyls (PCBs) in on-site soil, but the contaminated soil has reportedly been excavated and removed. The property is presently fenced and vegetated.

In November 1994, IEPA began field work on the site in response to a request from USEPA. IEPA prepared an Integrated Site Assessment. Four soil samples from 0 to 4 inches in depth were collected. Two of the four samples exceeded IEPA criteria, so IEPA determined that characterization of the site should continue. Independent contractors developed a sampling plan, dated February 14, 1996, that was approved by IEPA. The property owner's estate joined the voluntary IEPA Site Remediation Program and has been cleaning up the old manufacturing site.

In December 1996, contractors cleared the site and had it surveyed. A sampling grid (Figure 2) was established for the former operations areas, and 63 surface soil samples were analyzed for total lead. Six soil samples (2C, 2D, 2E, 11C, 11D, and 12E) were collected from 0 to 6 inches in depth. Additional subsurface fractions were submitted for analyses in areas 2D and 12E because a field photoionization detector response indicated a need for further evaluation. Samples were analyzed for volatile and semivolatile organic compounds. Shifrin & Associates compiled a list of contaminants whose concentrations were found above laboratory detection limits (Tables 1, 2 and 3) [3].

DISCUSSION

Site-related contaminants are selected for further evaluation, based on the following factors:

1. Laboratory-determined concentrations in samples collected on and off the site.

2. Review of the data quality, the field sampling techniques, the laboratory quality assurance and controls, and the sampling plan.

3. Comparison of contaminant concentrations with background concentrations.

4. Comparison of contaminant concentrations with environmental media comparison values.

Comparison values are contaminant concentrations used to select contaminants for further exposure evaluation (Attachment 1). The values include, but are not limited to, Environmental Media Evaluation Guides (EMEGs) for chronic (CEMEG) or intermediate (IEMEG) exposures, Reference Dose Media Evaluation Guides (RMEGs), and Cancer Risk Evaluation Guides (CREGs).

No contamination pattern was identified from the December 1996, systematic, surface soil collection. Adjacent grid samples often contained varying concentrations. All 63 surface soil samples were analyzed for lead. Six of the samples were also analyzed for arsenic, cadmium, and copper.

Lead was found most often at a level that exceeds the Illinois comparison value of 1,000 parts per million (ppm). Lead is especially toxic to unborn and preschool children. As lower environmental lead action levels have been developed, public health efforts have focused on education to prevent lead exposures. Pregnant women should avoid lead exposure because lead can cross the placenta and is extremely damaging to the developing nervous system.

Lead also can damage the adult nervous system. Shortly after lead enters the body, it travels in the blood to the liver, kidneys, and other soft tissue organs. Ultimately, lead is stored in bones and teeth.

The concentrations of lead found at this site ranged from 8.35 to 13,600 parts per million (ppm). IEPA staff compiled a summary of Illinois soil lead levels found in background samples in August 1994 [4]. The statistics from this report (in ppm) were:

	number of samples	range	mean	median
Urban sites	119	4.7-647	71.1	36.0
Rural sites	148	<7.4-240	31.5	20.9
Statewide	167	4.7-747	49.2	25.0

Table 1 shows the lead concentrations found in on-site soils during the December 1996 sampling event. Tables 2 and 3 list levels of inorganic and organic chemicals found at the site and the appropriate comparison values. A comparison value has not been developed for every element or chemical, so Illinois-specific soil standards have also been included for comparison purposes.

Ten samples exceeded the Illinois standard of 1,000 ppm for children aged 6 months to 6 years [6]. The distribution of lead does not appear to be consistent over the area of the site. The areas with higher lead levels could be attributed to past operations, recent soil excavations, building demolition, naturally occurring metals in soils, operations on nearby properties, or vehicular exhaust.

Only one sample of the six analyzed for cadmium had a concentration greater than the comparison value for chronic exposure to children. The ores processed at this site may not have contained much cadmium. None of the cadmium samples exceeded the comparison value of 500 ppm for adult exposure. Cadmium is considered a cumulative toxin in the human body. The body stores cadmium in the kidney, and once a significant concentration is reached, kidney failure can result.

The concentration of arsenic in only one sample exceeded the arsenic comparison value set for chronic exposure of children. None of the six soil samples were greater than the comparison value for chronic exposure for adults. Arsenic does not accumulate in the body and is excreted rapidly. Chronic ingestion of arsenic is associated with skin changes and skin cancer. Inhalation of arsenic is associated with lung cancer.

Some copper concentrations exceeded those found in Illinois urban settings. Little is known about chronic copper exposure in humans. Most human toxicological information is based on workplace inhalation exposures. Acute ingestion of significant copper often results in vomiting, so absorption is limited. Some copper is needed in the diet for normal physiological functions.

Because of the location of the site and site security, a child is not likely to trespass onto the site. If a child were to trespass onto the site twice a week over a five-year period and ingest soil containing the highest levels of cadmium and arsenic, the dose would not exceed levels associated with adverse health effects. The provisional tolerable intake (PTI) for lead , based on a blood lead level of 10-25 micrograms per deciliter (μg/dL), developed by the U.S. Food and Drug Administration for a 10-kg child is 6-18 micrograms per day (μg/day). Children trespassing onto the site could be exposed to levels ten times greater than the PTI.

The only organic chemical exceeding a soil comparison value is benzo(a)pyrene (BaP). A trespasser would not receive a dose that is associated with adverse health effects.

No off-site sampling was conducted. No other contaminant was found at levels exceeding comparison values.

CONCLUSIONS

The Gibralter Manufacturing site poses no apparent public health hazard at this time. Lead is the only contaminant that is a potential public health concern at this site should children enter the site and come in contact with lead in the soil. However, a child is not likely to trespass on the site because of the site location and site security.

RECOMMENDATIONS

1. Site access should remain restricted.

2. IDPH should review any new data generated for the site.

PREPARER OF REPORT

Catherine Copley
Environmental Toxicologist
Illinois Department of Public Health

REFERENCES

1. Illinois Environmental Protection Agency Bureau of Land Pollution (1997). Freedom of Information file search, June 1997, Springfield, Illinois.
2. Illinois Environmental Protection Agency Site Remediation Program (1997) Stanley Komperda, project manager. Illinois Environmental Protection Agency. Remedial Project Management Section. Springfield, IL. Personal communications.
3. Shifrin & Associates (1997) Site Remediation Program report. April 25, 1997. Environmental Engineering firm. St. Louis, Missouri.
4. Illinois Environmental Protection Agency (1994). A Summary of Selected Background Conditions for Inorganics in Soil (IEPA/ENV/94-161). Office of Chemical Safety. August 1994.
5. Agency for Toxic Substances and Disease Registry (1997) Environmental Media Evaluation Guides for Soil. March 1997.
6. Illinois Department of Public Health (1994) Illinois Lead Poisoning Prevention Act. 77 Illinois Administrative Code Chapter 845 Subchapter p Section 845.50. Amended at 19 Ill. Reg. 238, effective December 31, 1994.
7. Agency for Toxic Substances and Disease Registry (1997) Health Guidelines Comparison Values. March 1997.

CERTIFICATION

This Gibraltar Manufacturing Site Health Consultation was prepared by the Illinois Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

Gail D. Godfrey
Technical Project Officer
Division of Health Assessment and Consultation
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

Lisa C. Hayes for
Richard E. Gillig
Chief, State Programs Section
Division of Health Assessment and Consultation
ATSDR

Table 1. Gibraltar Manufacturing - Ranking and Central Statistics of Surface Soil Lead Concentrations in parts per million (ppm) from December 1996 Sampling.

Total Lead (ppm)	Sample Location	
13,600	7-B	
6,140	2-B	
2,950	3-D	
2,190	4-B	
2,020	3-B	
1,550	12-F	
1,450	13-E	
1,370	11-F	
1,260	10-A	
1,160	7-E	
976	8-F	
829	12-D	
782	8-E	
777	12-C	
711	13-F	
650	9-E	
632	10-F	
573	4-E	
550	12-A	
546	8-D	
518	12-E	(PID 2.7 - lab sample at 8-12')
513	13-C	
497	6-E	
495	4-C	
475	7-F	
445	6-F	
445	11-E	
415	13-D	
396	7-A	
378	9-A	
352	10-E	
346	2-A	
344	6-D	
317	3-C	
313	10-B	
312	7-D	
300	6-B	
296	4-F	
280	5-F	
278	5-A	

Table 1, Continued

259	11-A
247	5-B
245	9-F
243	4-A
232	3-A
225	5-D
215	5-E
213	5-C
212	3-F
211	9-D
188	6-A
174	2-F
161	4-D
103	10-C
83.2	6-C
69	11-B
62.4	12-B
52.4	2-E (PID 2.3 - 12-15' lab sample)
45.6	11-C (PID 3.1 - 8-12' lab sample)
21.2	3-E
13.8	2-D (PID 4.8 - 8-12' lab sample)
9.2	2-C (PID 3.1 - 8-12' lab sample)
8.35	11-D (PID 3.1 - 8-12' lab sample)

Mean = 821.02
Median = 346

Table 2. Gibraltar Manufacturing Inorganic Contaminants of Concern which Exceed Health Based Levels for Soil in parts per million (ppm) from December 1996 Sampling.

Sample Locations	Contaminant	Concentration (ppm)
2-B	Lead	6,140
3-B	Lead	2,020
3-C	Copper	396
3-D	Lead	2,950
4-B	Lead	2,190
5-B	Copper	232
7-B	Lead	13,600
7-D	Copper	705
7-E	Lead	1,160
10-A	Lead	1,260
10-E	Copper	222
11-F	Lead	1,370
12-D	Arsenic	21.6
12-D	Cadmium	83.3
12-D	Copper	1,350
12-F	Lead	1,550
13-E	Lead	1,450

Comparison Values used:

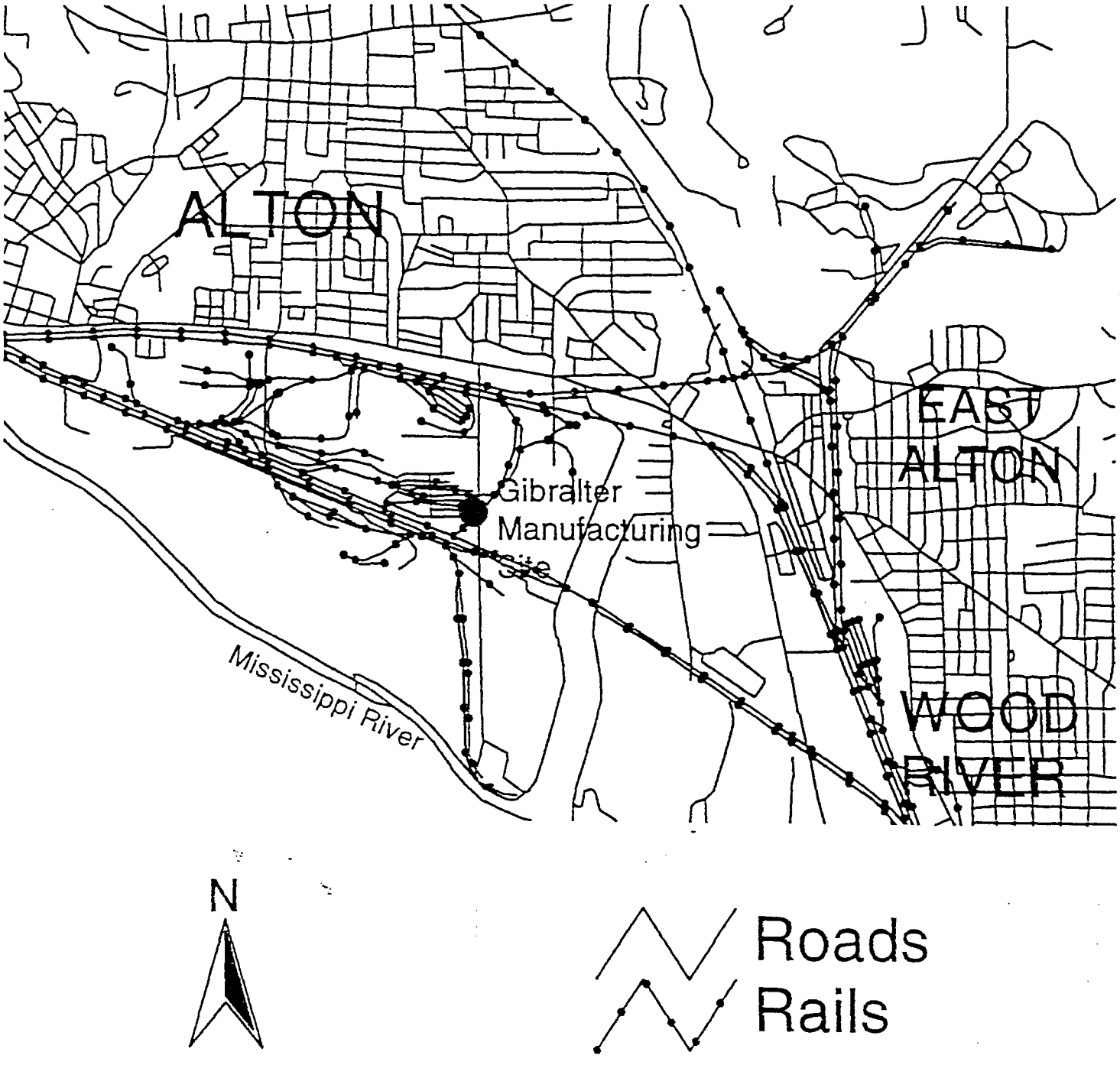
Arsenic - 20 ppm for children ATSDR soil chronic EMEG [5]
Cadmium - 40 ppm for children ATSDR soil chronic EMEG [5]
Copper - 150 ppm is Illinois urban background [4]
Lead - 1,000 ppm for children playing in bare contaminated soil [6]

Table 3. Gibraltar Manufacturing - List of Highest Concentration of Detected Organic On-Site Soil Contaminants from December 1996 Sampling and Available Health Comparison Values in parts per million (ppm).

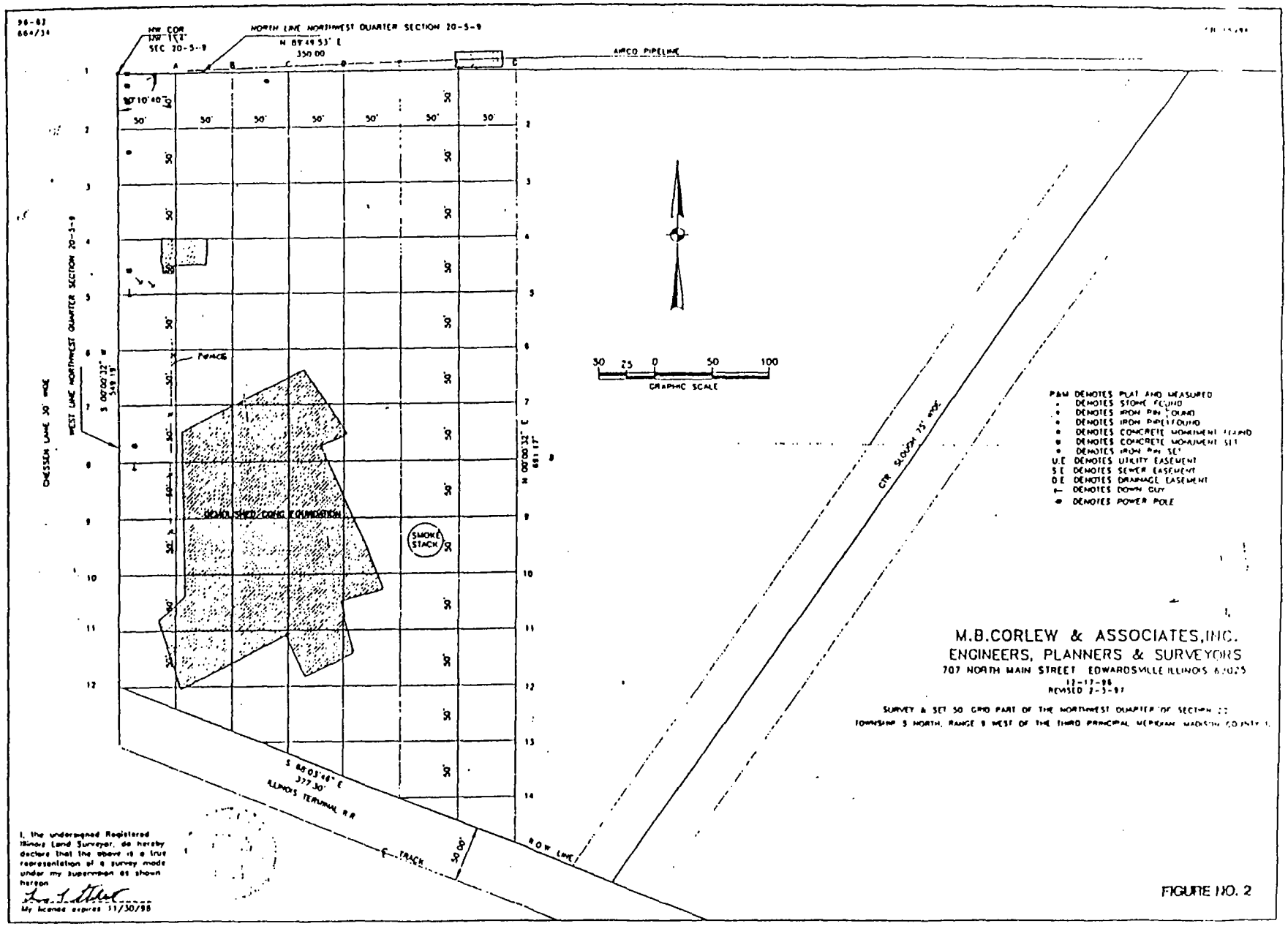
Contaminant	Sample location with highest detected concentration	Concentration (ppm)	Comparison Soil Value	
			ATSDR Pica Child	Source
VOLATILES (VOCs)				
Acetone	12-E (surface)	0.170	200	RMEG
Ethylbenzene	12-E (4'-8')	0.027	200	RMEG
Methylene chloride	12-E (surface)	0.140	90	CREG
Tetrachloroethene	12-E (surface)	0.074	10	CREG
Toluene	12-E (4'-8')	0.110	40	IEMEG
Xylenes (total)	012-E (4'-8')	0.110	1,000	IEMEG
SEMIVOLATILES (SVOCs)				
Naphthalene	11-A	1.200	40	IEMEG
2-Methylnapthalene	11-A	2.000	NONE	NONE
Acenaphthene	10-E	0.360J	100	RMEG
Dibenzofuran	10-E	0.420J	NONE	NONE
Fluorene	11-A	0.360	80	RMEG
Pyrene	10-E	9.200	60	RMEG
Butyl-benzylphathalate	3-C	1.900	400	RMEG
Bis(2-Ethylhexyl)phthalate	3-C	0.800	600	CREG
Benzo(a)anthracene	10-E	4.200	NONE	NONE
Chrysene	10-E	5.100	NONE	NONE
Benzo(b)fluoranthene	10-E	3.200	NONE	NONE
Benzo(k) fluoranthene	10-E	3.000	NONE	NONE
Benzo(a)pyrene	10-E	3.900	0.1	CREG
Dibenzo(a,h)anthracene	10-E	1.200J	NONE	NONE
Indeno(1,2,3-cd)pyrene	10-E	2.200	NONE	NONE
Benzo(g,h,i)perylene	10-E	1.200J	NONE	NONE

Figure 1

Location of the Gibralter Manufacturing Site in East Alton, Illinois



Source: IDPH GIS


NW COR NW 1/4 SEC 20-5-9
NORTH LINE NORTHWEST QUARTER SECTION 20-5-9
N 89°49'53" E 350.00
AMOCO PIPELINE
WEST LINE NORTHWEST QUARTER SECTION 20-5-9
CHESSEN LANE 30' WIDE
S 00°00'22" W 549.19'
N 00°00'22" E 661.17'
FENCE
BOARD SHED CONC FOUNDATION
SMOKE STACK
S 88°03'48" E 377.30'
ILLINOIS TERMINAL R.R.
℄ TRACK
50.00'
ROW LINE
CTR SLOUGH 75' +/-
GRAPHIC SCALE
50 25 0 50 100
P&M DENOTES PLAT AND MEASURED
DENOTES STONE FOUND
DENOTES IRON PIN FOUND
DENOTES IRON PIPE FOUND
DENOTES CONCRETE MONUMENT FOUND
DENOTES CONCRETE MONUMENT SET
DENOTES IRON PIN SET
U.E DENOTES UTILITY EASEMENT
S.E DENOTES SEWER EASEMENT
D.E DENOTES DRAINAGE EASEMENT
DENOTES DOWN GUY
DENOTES POWER POLE
M.B.CORLEW & ASSOCIATES, INC.
ENGINEERS, PLANNERS & SURVEYORS
707 NORTH MAIN STREET EDWARDSVILLE ILLINOIS 62025
12-17-96
REVISED 2-5-97
SURVEY & SET SO GRID PART OF THE NORTHWEST QUARTER OF SECTION 20
TOWNSHIP 5 NORTH, RANGE 9 WEST OF THE THIRD PRINCIPAL MERIDIAN MADISON COUNTY, I
I, the undersigned Registered Illinois Land Surveyor, do hereby declare that the above is a true representation of a survey made under my supervision as shown hereon
My license expires 11/30/98
FIGURE NO. 2

Comparison Values Used In Screening Contaminants For Further Evaluation

Environmental Media Evaluation Guides (EMEGs) are developed for chemicals based on their toxicity, frequency of occurrence at National Priority List (NPL) sites, and potential for human exposure. They are derived to protect the most sensitive populations and are not cut-off levels, but rather comparison values. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Reference Dose Media Evaluation Guides (RMEGs) are another type of comparison value derived to protect the most sensitive populations. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Cancer Risk Evaluation Guides (CREGs) are estimated contaminant concentrations based on one excess cancer in a million persons exposed to a chemical over a lifetime. These are also very conservative values designed to protect sensitive members of the population.

Maximum Contaminant Levels (MCLs) have been established by USEPA for public water supplies to reduce the chances of adverse health effects from contaminated drinking water. These standards are well below levels for which health effects have been observed and take into account the financial feasibility of achieving specific contaminant levels. These are enforceable limits that public water supplies must meet.

Lifetime Health Advisories for drinking water (LTHAs) have been established by USEPA and are the concentration of a chemical in drinking water that is not expected to cause any adverse non-carcinogenic effects over a lifetime of exposure. These are conservative values that incorporate a margin of safety.